

CLAIMS

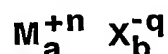
What is claimed is:

1. An image transfer element for thermally induced image transfer comprising:

5 a donor element support;

a colorant layer disposed upon said donor element support, wherein the colorant layer comprises a polymeric binder, a colorant, a surfactant in an amount ranging from about 0.1 to about 6.0% solid based on the total solids content and a metal salt having the structure:

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wherein M^{+n} is an organic cation, an inorganic cation, or a combination thereof; $n = 1, 2$ or 3 ; X is an anion or an aliphatic group containing from 1 to 5 carbon atoms containing an anion; $q = 1, 2$, or 3 ; and a and b are integers wherein $(a)(n) = (b)(q)$.

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2. The image transfer element according to Claim 1, wherein at least one heating layer is disposed between the donor element support and the colorant layer.

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3. The image transfer element according to Claim 2, wherein the at least one heating layer comprises a compound selected from the group consisting of organic and inorganic materials, wherein the materials may inherently absorb laser radiation.

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4. The image transfer element according to Claim 3, wherein the inorganic materials of the heating layer are selected from the group consisting of transition metal elements of Groups IIIA, IVA, VA, VIA, VIIA, IIB, IIIB, and VB of the Period Table of the Elements, metallic elements of Groups IIIA, IVA, VA, VIA, VIIA, IIB, IIIB, and VB of the Period Table of the Elements, their alloys with each other, and their alloys with the elements of Groups IA and IIA.

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5. The image transfer element according to Claim 3, wherein the organic and inorganic materials of the heating layer further include a laser-radiation absorbing compound selected from the group consisting of chromium, aluminum, carbon black, NIR cyanine dye compounds and combinations thereof.

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6. The image transfer element according to Claim 1, wherein the polymeric binder is selected from the group consisting of a homopolymer or copolymer of acrylic acid, a homopolymer or copolymer of esters of acrylic acid, a homopolymer or copolymer of methacrylic acid, a

homopolymer or copolymer of esters of methacrylic acid, a homopolymer or copolymer of alkyl methacrylic acid, a homopolymer or copolymer of esters of alkyl methacrylic acid acrylate esters, copolymers of styrene and olefin monomers, copolymers of styrene and acrylonitrile; fluoropolymers, copolymers of (meth)acrylate esters with ethylene and carbon monoxide, (meth)acrylate block copolymers, and (meth)acrylate copolymers containing other comonomer types, polycarbonates, (meth)acrylate homopolymers and copolymers, polysulfones, polyurethanes, polyesters, and combinations thereof.

7. The image transfer element according to Claim 3, wherein the polymeric binder is selected from the group consisting of starch derivatives, carboxymethylcellulose, polyvinyl alcohols based on acrylic acid, acrylic acid esters, acrylonitrile, vinyl acetate, butadiene, styrene and combinations thereof, and aqueous dispersions based on acrylic acid, acrylic acid esters, acrylonitrile, vinyl acetate, butadiene, styrene and combinations thereof.

8. The image transfer element according to Claim 1 wherein M^{+n} is selected from the group consisting of Na^{+1} , Li^{+1} , K^{+1} , Mg^{+2} , Ca^{+2} , Sr^{+2} , Ba^{+2} , Fe^{+2} , Fe^{+3} , Cu^{+2} , Zn^{+2} , Al^{+3} , NH_4^{+} , $N(R^1)_4^{+}$ and $S(R^1)_3^{+}$, wherein R^1 is an aliphatic group containing 1 to 6 carbon atoms.

9. The image transfer element according to Claim 1 in which M^{+n} is selected from the group consisting of $N(C_2H_5)_4^{+}$, $N(C_3H_7)_4^{+}$, $N(C_4H_9)_4^{+}$, $S(CH_3)_3^{+}$, $S(C_2H_5)_3^{+}$, $S(C_3H_7)_3^{+}$ and $S(C_4H_9)_3^{+}$.

10. The image transfer element according to Claim 1 wherein X^{-q} is selected from the group consisting of SO_4^{-2} , SO_3^{-2} , HSO_3^{-} , $S_2O_3^{-2}$, $S_2O_5^{-2}$, PO_4^{-3} , HPO_4^{-2} , $H_2PO_4^{-}$, F^{-} , Cl^{-} , Br^{-} , I^{-} , CO_3^{-2} , HCO_3^{-} , acetate ion and acetylacetate ion.

11. The image transfer element according to Claim 1 wherein the metal salt is magnesium sulfate, magnesium acetate, magnesium chloride, aluminum sulfate, calcium chloride, or $AlK(SO_4)_2$ and $Al(NH_4)(SO_4)_2$.

12. The image transfer element according to Claim 1, wherein the metal salt is selected from the group consisting of anhydrides or hydrates of metal salts.

13. The image transfer element of Claim 1 in which the metal salt is a carboxylate salt.

14. The image transfer layer according to Claim 2, further comprising at least one ejection layer comprising a compound selected from the group consisting of polycarbonates having low decomposition

temperatures (Td), substituted styrene polymers having low decomposition temperatures, polyacrylate and polymethacrylate esters, cellulosic materials having low decomposition temperatures (Td), polyvinyl chloride, poly(chlorovinyl chloride) polyacetals, polyvinylidene chloride,
 5 polyurethanes with low Td, polyesters, polyorthoesters, acrylonitrile, substituted acrylonitrile polymers, maleic acid resins, copolymers of the above compounds and mixtures thereof.

15 15. The image transfer element according to Claim 1, wherein the colorant is selected from the group consisting of a substantially transparent organic pigment, a substantially transparent inorganic, an opaque organic pigment, an opaque inorganic pigment, a dye, a color-forming dye and combinations thereof.

16. The image transfer element according to Claim 1, wherein the colorant layer further comprises a thermal amplification additive.

15 17. The image transfer element according to Claim 2, wherein the at least one heating layer further comprises a thermal amplification additive.

18. The image transfer element according to Claim 14, wherein the at least one ejection layer further comprises a thermal amplification
 20 additive.

19. An image transfer element for thermally induced image transfer comprising:

a donor element support selected from the group consisting of a co-extruded polyethylene terephthalate film, a polyolefin film and a paper ;

25 a colorant layer disposed upon said donor element support, wherein the colorant layer comprises a polymeric binder selected from the group consisting of starch derivatives, carboxymethylcellulose, polyvinyl alcohols based on acrylic acid, acrylic acid esters, acrylonitrile, vinyl acetate, butadiene, styrene and combinations thereof, and aqueous
 30 dispersions based on acrylic acid, acrylic acid esters, acrylonitrile, vinyl acetate, butadiene, styrene and combinations thereof; a colorant, a surfactant in an amount ranging from about 0.1 to about 6.0% solid based on the total solids content and a metal salt having the structure:



M^{+n} is selected from the group consisting of $N(C_2H_5)_4^+$, $N(C_3H_7)_4^+$, $N(C_4H_9)_4^+$, $S(CH_3)_3^+$, $S(C_2H_5)_3^+$, $S(C_3H_7)_3^+$ and/or $S(C_4H_9)_3^+$; X^{-q} is selected from the group consisting of SO_4^{-2} , SO_3^{-2} ,

HSO_3^- , $\text{S}_2\text{O}_3^{2-}$, $\text{S}_2\text{O}_5^{2-}$, OAc^- , PO_4^{3-} , HPO_4^{2-} , H_2PO_4^- , halogen, CO_3^{2-} , HCO_3^- , and acetylacetate; and a and b are integers where $(a)(n) = (b)(q)$; and

at least one heating layer is disposed between the donor element support and the colorant layer.

20. A laserable assemblage comprising the image transfer element according to Claim 1 and a receiver element.

21. A process for producing a thermal image, wherein the process comprises the steps of:

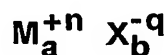
- (a) imagewise exposing the laser assemblage according to Claim 19 to a laser;
- (b) separating the donor element according to Claim 1 from a receiver element; and optionally
- (c1) transferring the image receiving layer to a permanent substrate; or
- (c2) transferring the image receiving layer to an intermediate element and subsequently to a permanent substrate; or
- (c3) removing the receiver support resulting in an assemblage or sandwich comprising the permanent substrate, the thermoplastic layer, the colored transfer image, and the image receiving layer.

22. A process for improving imaging latitude in the production of a thermal image comprising the steps of imagewise exposing to laser radiation an assemblage comprising a receiver element and an image transfer element for thermally induced image transfer comprising:

a donor element support;

a colorant layer disposed upon said donor element support,

wherein the colorant layer comprises a polymeric binder, a colorant, a surfactant in an amount ranging from about 0.1 to about 6.0% solid based on the total solids content and a metal salt having the structure:



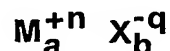
wherein M^{+n} is an organic cation, an inorganic cation, or a combination thereof; $n = 1, 2$ or 3 ; X is an anion or an aliphatic group containing from 1 to 5 carbon atoms containing an anion; $q = 1, 2$, or 3 ; and a and b are integers wherein $(a)(n) = (b)(q)$.

23. A method for making a monochrome or color filter element suitable for use in a liquid crystal display device, comprising the steps of:

heating an image transfer element comprising:

a donor element having a support layer and a colorant layer and an image receiver, the colorant layer being sandwiched between the support layer and the image receiver;

- 5 the colorant layer comprising a polymeric binder, a colorant, a surfactant in an amount ranging from about 0.1 to about 6.0% solid based on the total solids content and a metal salt having the structure:



- 10 wherein M^{+n} is an organic cation, an inorganic cation, or a combination thereof; $n = 1, 2$ or 3 ; X is an anion or an aliphatic group containing from 1 to 5 carbon atoms containing an anion; $q = 1, 2$, or 3 ; and a and b are integers wherein $(a)(n) = (b)(q)$;

- 15 imagewise exposing part of the image transfer element to actinic radiation to provide an exposed assemblage;

separating support layer from the receiver of the exposed assemblage to obtain a color filter element.

24. The method of Claim 23 in which the receiver is glass.

25. A method for making a liquid crystal display device comprising a
20 the monochrome or color filter element made by the method of Claim 23 associated with an electrically conductive coating, a liquid crystal material and an alignment layer.